

Abstracts

A19

(OR:1.16; CI:1.03–1.31), and >2 (OR:1.47; CI:1.30–1.65)]. Findings were similar when stratifying the sample by age group. **CONCLUSIONS:** Findings suggest that a quarterly assessment of SABA utilization can be used to identify patients at risk for asthma-related exacerbations. The incidence of an asthma exacerbation was associated with greater SABA use in the previous quarter.

RR2

HEALTH CARE UTILIZATION AND COST OF COPD IN A MEDICAID POPULATION: THE ROLE OF CO-MORBID CONDITIONS

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OBJECTIVES: Comorbidities in patients with chronic obstructive pulmonary disease (COPD) are associated with higher mortality, hospitalization, and poor quality of life. The objectives of this study were to characterize a comprehensive comorbidity profile among COPD patients, and to explore the impact of comorbidities on medical utilization and cost in a low-income Medicaid population. **METHODS:** This retrospective cohort study analyzed medical claims from the Maryland Medicaid database. We employed a 1:2 case-control design to select 1388 COPD patients aged 40 to 64 years with at least 24 months of continuous enrollment and 2776 demographically-matched controls without COPD. Logistic regressions were performed to calculate odds ratios that compared differences in the prevalence of comorbidities, including 17 conditions defined by the Charlson Comorbidity Index (CCI) and 6 additional conditions known to coexist with COPD. Generalized linear models were performed to estimate the average medical utilization and cost by specific comorbidity. **RESULTS:** Medicaid COPD patients had more comorbidities compared with non-COPD controls (CCI score = 1.56 vs. 1.37, $p = 0.004$), and were more likely to have myocardial infarction, congestive heart failure, cerebrovascular disease, peptic ulcer, mild liver disease, hypertension, sleep apnea, tobacco use, and edema. COPD patients on average had 16 more medical claims (81.4 vs. 65.4, $p < 0.001$) and incurred \$1871 higher medical cost per year than non-COPD controls (\$7603 vs. \$5732, $p < 0.001$). Ten out of the 17 conditions defined by the CCI as well as hypertension, tobacco use, and edema were associated with the excess medical utilization and cost in COPD patients. Depression was associated with excess medical utilization but not cost. **CONCLUSIONS:** Medicaid COPD patients have a substantial burden of comorbidities, which translate into higher medical utilization and cost. Effective disease management and treatment protocols are needed to reduce co-morbidity burden.

RR3

USE OF HEALTH CARE SERVICES IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) TREATED WITH BUDESONIDE/FORMOTEROL VIA DRY POWDER INHALER (BUD/FM DPI) VERSUS TIOTROPIUM DPI

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OBJECTIVES: To assess real-world effectiveness of BUD/FM DPI versus tiotropium DPI in COPD patients **METHODS:** Data from the Quebec health care databases were used to construct a matched cohort of COPD patients aged ≥40 years newly treated with BUD/FM DPI or tiotropium DPI from 2003–2007. Patients were matched on age, sex, COPD exacerbations (short-course prescription of oral corticosteroids [OCSs], emergency department [ED] visits or hospitalizations for COPD; d2 events occurring within 15 days counted as 1 exacerbation), and use of short-acting inhaled β_2 -agonists (SABAs) and ipratropium in the year before therapy began. The number of exacerbations, ED visits, and hospitalizations for COPD; claims for OCS prescriptions; and the average weekly doses (dose = 2 inhalations) of SABAs and ipratropium were compared for BUD/FM DPI versus tiotropium DPI users for a 1-year post-therapy period. Poisson and linear regression models were used to produce adjusted rate ratios (RR) and mean differences (MD). **RESULTS:** Of 981 BUD/FM DPI and 981 tiotropium DPI users in the cohort, 78% were aged ≥65 years and 53% were men. No significant differences were seen for COPD exacerbations (RR = 0.94; 95% CI, 0.77–1.15), ED visits for COPD (RR = 0.80; 95% CI, 0.54–1.20), and claims for OCS prescriptions (RR = 0.93; 95% CI, 0.72–1.21) between BUD/FM DPI and tiotropium DPI users in the year after the start of therapy. However, BUD/FM DPI users had significantly fewer hospitalizations for COPD (RR = 0.65; 95% CI, 0.44–0.97), used less SABAs (MD = −0.48; 95% CI, −0.67 to −0.28), and used more ipratropium (MD = 0.35; 95% CI, 0.21–0.50). **CONCLUSIONS:** These findings showed that patients using BUD/FM DPI were significantly less likely to have COPD exacerbations leading to a hospitalization, but as likely as tiotropium DPI users to require emergency care or OCS therapy in the year after initiation of therapy.

RR4

OUTCOMES ASSOCIATED WITH TIOTROPIUM USE IN COPD PATIENTS

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OBJECTIVES: To date, there is mixed evidence on the safety and effectiveness of tiotropium. Our objective was to evaluate the comparative effectiveness of regimens containing tiotropium versus other medication regimens for chronic obstructive pul-

monary disease (COPD) in real-world clinical settings. **METHODS:** We conducted a cohort study on two separate cohorts with a diagnosis of COPD in the VA health care system. Patients with a COPD diagnosis prescribed tiotropium and patients in a historic cohort prior to the introduction of tiotropium were selected for comparison using propensity scores, with the base case including scores from 0.1 to 0.4. Outcomes identified during follow-up were all-cause mortality, COPD exacerbations, and COPD hospitalizations. Exposure to COPD medication regimens was defined in a time-varying manner and Cox proportional hazards regression were employed to evaluate outcomes. **RESULTS:** For 42,090 patients in the base case, the regimen of tiotropium plus inhaled corticosteroids plus long-acting beta-agonists was associated with 40% reduced risk of death (HR = 0.60 [95% CI 0.45, 0.79]) compared to inhaled corticosteroids plus long-acting beta-agonists. This combination was also associated with reduced rates of COPD exacerbations (HR = 0.84 [0.73, 0.97]) and COPD hospitalizations (HR = 0.78 [0.62, 0.98]). Tiotropium in combination with other medication regimens was associated with increased risk of events compared to inhaled corticosteroids plus long-acting beta-agonists. **CONCLUSIONS:** When used with inhaled corticosteroids and long-acting beta-agonists, tiotropium use was associated with a decreased risk of mortality compared to treatment with inhaled corticosteroids and long-acting beta-agonists. However, this result was not consistent in other medication regimens that included tiotropium.

POSTER SESSION I

CONCEPTUAL PAPERS & RESEARCH ON METHODS – Clinical Outcomes Methods

PMCI

CLASSIFYING PATIENTS WITH METABOLIC SYNDROME USING THE LATENT CLASS ANALYSIS (LCA)

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OBJECTIVES: To identify subgroups of metabolic syndrome patients who would be more homogeneous in terms of metabolic risk factors. **METHODS:** The electronic medical record database from GE Healthcare was used for this study. The database comprises de-identified longitudinal medical records of nationally representative patients attending general practitioners. All adult patients were assessed for the presence of metabolic syndrome using the guidelines proposed by the National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III). A latent class analysis was conducted based on the abnormality of patients' metabolic risk factors including triglycerides (TG; ≥ 150 mg/dL), high-density lipoprotein cholesterol (HDL-C; men: < 40 mg/dL; women: < 50 mg/dL), blood pressure (BP; systolic ≥ 130 mmHg, diastolic ≥ 85 mmHg, or drug treatment for hypertension), fasting plasma glucose (≥ 100 mg/dL or drug treatment for diabetes mellitus), and waist circumference (WC; men: ≥ 102 cm; women: ≥ 88 cm). The final model was selected based on model fit indices including Akaike's information criterion, Bayesian information criterion (BIC), and sample-size adjusted BIC. **RESULTS:** Metabolic syndrome was present in 19,251 individuals. The prevalence of high blood pressure was 96.4%. All the fit indices in the LCA modeling pointed to a 5-class solution. In addition to high blood pressure, members of Class 1 (6.5%) had abnormal TG and HDL-C; members of Class 2 (4.6%) had abnormal HDL-C and WC; members of Class 3 (19.7%) had abnormal TG and WC and the majority also had abnormal HDL-C (probability: 68.7%); members of Class 4 (8.2%) had abnormal plasma glucose and WC; and members of Class 5 (61.1%) had high probability of abnormality in all metabolic risk factors (range: 79.9–100%). **CONCLUSIONS:** LCA represents a new method for casemix study of patients with metabolic syndrome. The subgroups of metabolic syndrome identified in this study need to be further studied for its usefulness in clinical and health services research.

PMCM2

LONGITUDINAL DATA EXPLORATION WITH STACKED CUMULATIVE PERCENT PLOTS FOR CATEGORICAL DATA

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Longitudinal clinical trial data present analysts with the unique challenge of summarizing large trends over time without losing the detail of changes from one timepoint to the next. Analysts must find a balance between the preservation of details at each timepoint and parsimonious output that can be easily summarized and interpreted. For instruments that measure outcomes using nominal or ordinal response categories, analysts may want to preserve categorical information by reporting response category frequencies over time. In this case, the frequency of change across the course of treatment or disease progression is more informative, and perhaps more appropriate, than mean or median change. Collapsing responses into mean or medians draws attention to overall trends, while losing the ability to detect movement from one category response to another. A novel data visualization solution, stacked cumulative percent plots, allows analysts to retain individual categorical responses and track the movement of categorical responses over time. Comparisons of stacked cumulative percent plots with mean plots illustrate the additional information that can be learned from retaining categorical information. Further, a variation of the proposed plot allows analysts to visualize the frequency of response category changes